

Claims

1. A method for the continuous polymerization of vinyl monomers to vinyl polymers,
characterized in that
5 the polymerization takes place in a planetary roller extruder.
2. The method for continuous polymerization of vinyl monomers to vinyl polymers of
claim 1,
characterized in that
10 the vinyl polymers have a molecular weight M_w of more than 400 000 g/mol and/or
polydispersities (M_w/M_n) of greater than 5.
3. The method of claim 1 or 2,
characterized in that
15 the polymerization takes place without addition of solvent.
4. The method of at least one of claims 1 to 3,
characterized in that
the polymerization
20 a) takes place in a hydraulically filled planetary roller extruder,
b) is carried out by thermally induced decomposition of free radical-forming initiators,
c) takes place in the presence of 0 to 25% by weight, based on the vinyl monomers
of a solvent, and/or
d) is carried out in the presence of resin or plasticizers in fractions of 0 to 30% by
25 weight, preferably in fractions of 0 to 10% by weight, more preferably in fractions
of 0 to 5% by weight.
5. The method of at least one of the preceding claims,
characterized in that
30 the hydraulic filling of the planetary roller extruder with reaction mixture takes place by
means of
a) the material exit aperture of the planetary roller extruder being situated higher
than the maximum fill level of the reaction mixture within the roller barrels,

b) central spindle and planetary spindles rotate counter to the material conveying direction normally induced by the helical gearing, the conveying of the reaction mixture within the planetary roller extruder then taking place by means of the preferred feed pump for the vinyl monomers.

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6. The method of at least one of the preceding claims, characterized in that

the mixture of the vinyl monomers is preheated, prior to entering the planetary roller extruder, to temperatures of more than 50°C, preferably to temperatures above 70°C, and more preferably to temperatures of more than 85°C.

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7. The method of at least one of the preceding claims, characterized in that

the initiators are cooled and are added to the vinyl monomers not until immediately before entry of the monomer stream into the planetary roller extruder.

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8. The method of at least one of the preceding claims, characterized in that

further initiators are added at at least one further site downstream of the process section of the planetary roller extruder.

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9. The method of at least one of the preceding claims, characterized in that

the initiators for initiating the reaction have half-lives of 10 hours at temperatures of less than 120°C and are selected from the group of the azo initiators, from the group of the organic peroxides, or from mixtures of initiators of the stated groups, preferably those having a crosslinking efficiency of less than 20%, in particular those having a crosslinking efficiency of less than 10%.

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10. The method of at least one of the preceding claims, characterized in that

the initiators added downstream of the process section have half-lives of 10 hours at temperatures of more than 50°C and are selected from the group of the azo initiators,

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from the group of the organic peroxides, or from mixtures of initiators of the groups stated.

11. The method of at least one of the preceding claims,

5 characterized in that
the vinyl monomers contain compounds and/or the reaction mixture which has already been initially polymerized is supplied with compounds which lower the molecular weight during the polymerization, said compounds being selected preferably from the group of the nitroxyl compounds, thiols, TEMPO derivatives,
10 thioesters, thiocarbonates, alcohols, ethers, and halogenated hydrocarbons, and are present with particular preference in fractions of 0 to 5% by weight, preferably 0 to 3% by weight, more preferably 0 to 1% by weight, with respect to the vinyl monomers employed.

12. The method of at least one of the preceding claims,

characterized in that
liquid resins, resin melts or plasticizers are added in fractions of 0 to 30% by weight, preferably of 0 up to 5% by weight, to the reaction mixture after the beginning of polymerization.

13. The method of at least one of the preceding claims,

characterized in that
more than 30%, preferably more than 45%, of the vinyl monomers are reacted to vinyl polymers.

14. The method of at least one of the preceding claims,

characterized in that
the vinyl polymers are freed from their volatile constituents, preferably inline.

15. The method of at least one of the preceding claims,

characterized in that
the vinyl polymers are admixed, preferably inline, with further substances such as tackifying resins, fillers, crosslinkers and/or crosslinker assistants and, in this way,

vinyl polymer compounds are prepared which find use as pressure-sensitive self-adhesive compounds.

16. The method of at least one of the preceding claims,
5 characterized in that
the vinyl polymers are used in a downstream process stage as vinyl prepolymers for producing pressure-sensitive self-adhesive compounds.

17. The method of at least one of the preceding claims,
10 characterized in that
the vinyl polymers or the vinyl polymer compounds are applied inline to the production operation to carrier materials in web form.